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(54) Device for loading powder in molds of ceramic presses

Verfahren zum Fördern von pulverförmigem Material in Pressformen für Keramik

Dispositif pour le chargement du matériau en poudre dans les moules des presses pour matière
céramique

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Description

The present invention relates to a device for loading powder in molds of ceramic presses.

As is known, in ceramic presses there are devices for transferring the powder into the molds; said devices consist of a slider which is actuated with reciprocating motion between a position for receiving the powder from a hopper, which is external to the press, and a position which lies above the mold for filling the forming chamber.

With these devices, there is the problem that powder is fed into the slider even when said slider moves over the mold at the end of the pressing step. This simultaneous condition entails the overlap of different adjustment requirements which leads to irregularities in the distribution of the powder in the slider and consequently in the forming chamber, causing non-uniformity problems of the pressed product.

Furthermore, with known devices it is not possible to strictly control the deposition of the powder in the slider and consequently its density in the forming chamber.

A device having the features set forth in the preamble of claim 1 is known from the prior document DE-A-3332969.

The technical aim of the present invention is therefore to provide a device which allows to load the molds of ceramic presses without the above described problems.

This aim is achieved with a device according to claim 1.

Further peculiarities will become apparent from the following description of an embodiment illustrated only by way of non-limitative example in the accompanying drawing, wherein:

the figure is a schematic lateral elevation view of the device according to the invention.

With reference to the above figure, the reference numeral 1 designates a generic press for manufacturing ceramic tiles. The press comprises, in a manner which is known and therefore not described in detail, a base 2 from which vertical guiding posts 3 for an upper cross-member 4 rise; said cross-member 4 supports the pressing punches 5.

The forming mold is arranged on the base 2 and is composed of an annular matrix die 6 which surrounds the counterpunches 7. Said counterpunches 7 are moveable between a raised level, at which they are coplanar with the upper face of the matrix die, and a lowered level, in which they define, together with the matrix die, the chambers 8 into which the powder to be pressed must be introduced.

The powder is transferred into the chambers 8 by a slider 9 which is associated with the loading device, generally designated by the reference numeral 10, and is slideable on a surface 11 which is coplanar with the matrix die 6.

The loading device comprises a carriage 12 which supports a hopper 13 having a lower discharge outlet 14 controlled by a valve 15.

A secondary hopper 16 leads, in an upward position, into the hopper 13, is rigidly associated with said hopper and is capable of keeping a constant level of powder inside said hopper 13.

The secondary hopper 16 is, in any case, not indispensable for the correct functionality of the device.

The valve 15 comprises a shutter 18 which is articulated to the hopper about an axis 19 and is actuated by means of an actuator 20 which is constituted by a cylinder whose jacket is articulated to the hopper 13 and whose stem is articulately coupled to the shutter 18. The carriage 12 which supports the hopper 13 slides on rails 22 by means of wheels 21 and is actuated between the two positions shown in the figure in solid lines and in broken lines by means of an actuator, not shown, with the possibility of assuming variable speeds between said two positions.

A possible operation of the described device is as follows.

Assume that the slider 9 has just completed the filling of the chamber 8 and has moved so that it is above the surface 11, while the hopper 13 is in position A.

At this stage, while the cross-member 4 descends in order to press the powder contained in the chamber 8, the outlet 14 of the hopper is opened and the device 10 is transferred from the solid-line position A to the broken-line position B. Positions A and B can be adjusted with respect to the carriage. An accurate distribution of the powder in the slider 9 is thus produced.

When the device has reached its stroke limit, the shutter 18 is actuated again in the position for closing the outlet 14, so that when the cross-member 4 of the press has risen, the slider 9 can be transferred above the matrix die in order to deposit the subsequent dose of powder in the chamber 8. Meanwhile, the device 10 has returned to its initial position, close to the press, ready to resume the cycle in the above described manner. It is also possible to provide that the loading of the slider 9, when it is over the surface 11, occurs once during the forward stroke of the device 10 and once during its return stroke.

According to a preferred embodiment of the invention, the carriage 12 is moved at a variable speed in order to ensure a different distribution of the powder in the slider.

Equally, it is possible to vary the distribution of the powder by providing appropriate undulations in the profile of the rails 22, so as to raise and lower the discharge outlet 14 with respect to the slider. A differentiation is thus obtained in the thickness of the powder contained in the slider, as is often requested when one wishes to intervene on localized regions of the finished product in order to obtain certain effects.

As can be seen, the above described invention allows to obtain substantial advantages by virtue of the fact that the slider is loaded during the pressing step and thus in a period of time which is long enough to ensure perfect control of the distribution of the powder which is contained in the slider 9 and is then discharged into the forming chamber 8.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Device for loading powder in molds of ceramic presses, comprising a powder transfer slider (9) moveable along a horizontal plane (11) between a position for receiving powder from a hopper (13) provided with a discharge outlet (14) and a position of superimposition on the mold (6,7) in order to fill the forming chamber (8), characterized in that said hopper (13) is moveable above said slider (9) along guiding rails (22) when said slider (9) is in said receiving position, said rails (22) having an undulated profile in order to raise and lower the discharge outlet (14) of the hopper (13) with respect to the slider (9) according to the thickness of powder to be discharged into said slider (9).
2. Device according to claim 1, characterized in that said hopper (13) is moveable above said slider (9) when said slider (9) is in said receiving position and is provided with a discharge outlet (14) which is controlled by a valve (15) so as to distribute the powder in said slider (9) during the movements of the hopper (13).
3. Device according to claim 1 or 2, characterized in that said hopper (13) is mounted on a carriage (12) slideable on said rails (22).
4. Device according to one of claims 1 to 3, characterized in that a secondary hopper (16) leads into said hopper (13) for keeping a constant level of powder inside said hopper (13).
5. Device according to any one of claims 2 to 4, characterized in that said carriage (12) is actuated with variable motion between the two adjustable stroke limits according to the required distribution of powder in the transfer slider (9).

Patentansprüche

1. Vorrichtung zum Laden von Pulver in Formen von Keramikpressen mit einem Pulverübertragungsschieber (9), der längs einer horizontalen Ebene (11) zwischen einer Position zur Aufnahme von Pulver aus einem mit einem Abgabeauslaß (14) versehenen Trichter (13) und einer Position über der Form (6, 7) zum Füllen der Formgebungskammer (8) bewegbar ist, dadurch gekennzeichnet, daß der Trichter (13) über dem Schieber (9) entlang Füh-

rungsschienen (22) bewegbar ist, wenn sich der Schieber (9) in der Aufnahmeposition befindet, wobei die Schienen (22) ein gewelltes Profil aufweisen, um den Abgabeauslaß (14) des Trichters (13) nach der Dicke des in den Schieber (9) abzugebenden Pulvers bezüglich des Schieber (9) anzuheben und abzusenken.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Trichter (13) über dem Schieber (9) bewegbar ist, wenn sich der Schieber (9) in der Aufnahmeposition befindet, und mit einem Abgabeauslaß (14) versehen ist, der durch ein Ventil (15) derart gesteuert wird, daß das Pulver während der Bewegungen des Trichters (13) in dem Schieber (9) verteilt wird.
3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß der Trichter (13) auf einem Schlitten (12) angebracht ist, der an den Schienen (22) gleiten kann.
4. Vorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß ein Sekundärtrichter (16) in den Trichter (13) führt, um in dem Trichter (13) einen konstanten Pulverpegel zu halten.
5. Vorrichtung nach einem der Ansprüche 2 bis 4, dadurch gekennzeichnet, daß der Schlitten (12) je nach der erforderlichen Pulververteilung in dem Übertragungsschieber (9) mit variabler Bewegung zwischen den beiden einstellbaren Hubgrenzen betätigt wird.

Revendications

1. Dispositif pour charger une poudre dans des moules de presses pour céramique, comprenant une coulisse (9) de transfert de poudre mobile le long d'un plan horizontal (11) entre une position pour recevoir la poudre en provenance d'une trémie (13) pourvue d'une sortie (14) de déchargement et une position de superposition sur le moule (6, 7) de manière à remplir la chambre (8) de formage, caractérisé en ce que ladite trémie (13) est mobile au-dessus de ladite coulisse (9) le long de rails (22) de guidage lorsque ladite coulisse (9) se trouve dans ladite position pour recevoir, lesdits rails (22) ayant un profil ondulé de manière à lever et à abaisser la sortie (14) de déchargement de la trémie (13) par rapport à la coulisse (9) en fonction de l'épaisseur de la poudre à décharger dans ladite coulisse (9).
2. Dispositif selon la revendication 1, caractérisé en ce que ladite trémie (13) est mobile au-dessus de ladite coulisse (9) lorsque ladite coulisse (9) se trouve dans ladite position pour recevoir et est pourvue d'une sortie (14) de déchargement commandée par une soupape (15) de manière à répartir la poudre

dans ladite coulisse (9) au cours des déplacements de la trémie (13).

3. Dispositif selon la revendication 1 ou 2, caractérisé en ce que ladite trémie (13) est montée sur un chariot (12) pouvant être coulissé sur lesdits rails (22). 5
4. Dispositif selon l'une des revendications 1 à 3, caractérisé en ce qu'une trémie secondaire (16) débouche dans ladite trémie (13) afin de maintenir un niveau constant de poudre à l'intérieur de ladite trémie (13). 10
5. Dispositif selon l'une quelconque des revendications 2 à 4, caractérisé en que ledit chariot (12) est actionné selon un mouvement variable entre les deux fins de course ajustables, en fonction de la répartition requise de poudre dans la coulisse (9) de transfert. 15

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